

***Horcomutilla* Casal: Description of Previously Unknown Males, New Distribution Records, and Comments on the Genus (Hymenoptera: Mutillidae)**

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Abstract.—The previously unknown male of the genus *Horcomutilla* Casal is described, based on sex associations in two species, *H. krombeini* Casal, 1965 and *H. maracayi* Fritz & Martínez, 1993. These males are unique among American Sphaerophthalminae in having the distal third of their parameres bifid. *Horcomutilla krombeini* Casal, previously known from Panama, is recorded from Venezuela. A generic discussion is presented.

INTRODUCTION

The pseudomethocine genus *Horcomutilla* Casal, 1962 is known from 14 species, all known from females only, distributed from the Province of Chiriquí (near Costa Rica), Panama, south into Argentina (Casal 1962, 1965, 1970; Cambra & Quintero 1992; Fritz 1992; Fritz & Martínez 1993). Females of *Horcomutilla* range from 6 to 12 mm in body length and are quite variable in the color of the integument. We comment on the somatic variation we have observed in two species of *Horcomutilla*: *H. krombeini* Casal and *H. maracayi* Fritz & Martínez.

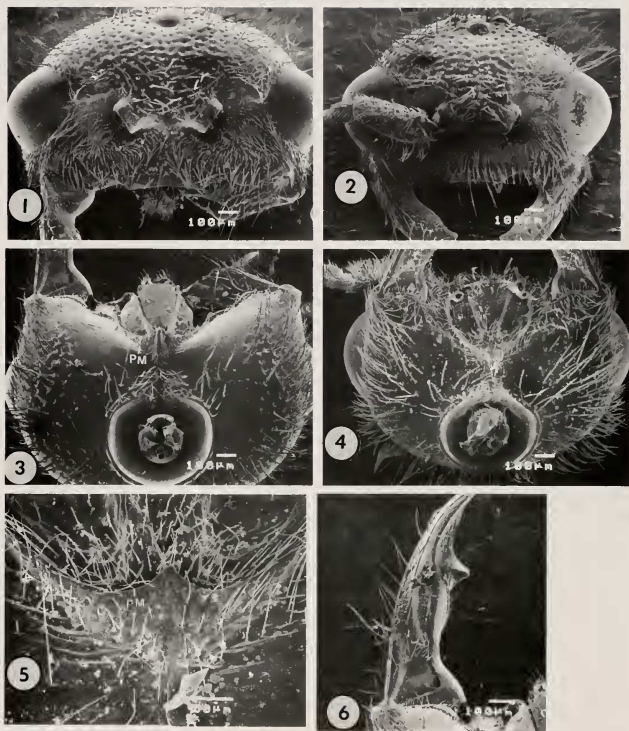
We here describe the first males known for the genus *Horcomutilla* and associated them with females of *H. krombeini* Casal and *H. maracayi* Fritz & Martínez from material collected in Panama (19 males) and Venezuela (2 males). Descriptions are followed by additional material examined, new distributional data and taxonomic notes. We recently incorporated the males of *Horcomutilla* into a generic key for Peruvian mutillids (Quintero & Cambra 1996). Their genitalia are unique among Sphaerophthalminae from America that we have examined, including males of *Calo-*

mutilla Mickel, 1952, and *Pertyella* Mickel, 1952 (Quintero & Cambra, unpublished), in having the distal third of the parameres bifid. Scanning electron microscopy was done with a JEOL model JSM 5300LV. The following acronyms are used: U.S. National Museum of Natural History at Smithsonian Institution (USNM); University of Minnesota Insect Collection (UMIC), and Museo de Invertebrados G. B. Fairchild at Universidad de Panamá (MIUP).

HORCOMUTILLA Casal, 1962

Type species: *Sphinctomutilla fronticornis* var. *glabriceps* André, 1908 (Museo Argentino de Ciencias Naturales); female lectotype designation by Casal (1962).

Generic characters of males.—Proboscidal fossa not extending to base of mandibles (Figs. 3–4); genal carinae absent; proximal two-thirds of mandibles broad, then narrowed, forming a conspicuous tooth on the inner margin, the distal third slender and edentate (Fig. 6); scape with a single sharp carina beneath; first and second flagellomeres equal in length; antennal scrobes slightly carinate above (Fig. 1); humeral angles of pronotum rounded (Figs. 7–8); par-



Figs. 1-6. Head details of *Horcomutilla*, males. 1, *krombeini*, head, frontal view ($\times 75$). 2, *maracayi*, head, frontal view ($\times 75$). 3, *krombeini*, head, ventral view ($\times 75$); PM = posterior margin of proboscidal fossa. 4, *maracayi*, head, ventral view ($\times 75$). 5, *maracayi*, posterior margin of proboscidal fossa, triangular projection without a middle longitudinal ridge ($\times 350$); PM = posterior margin of proboscidal fossa. 6, *krombeini*, mandible (ventral face), lateral view ($\times 100$).

apsidal lines nearly obliterated (Fig. 7); dorsum and posterior face of propodeum rounded into one another, without an enclosed space, reticulate throughout (Fig. 7-

8); abdomen with segment one completely sessile with second; tergum two with felt lines; sternum two without felt lines; marginal cell of front wings rounded distally

and acute at the apices (Figs. 11–12); third submarginal cell present but less distinct than the second; parameres with the distal third bifid (Figs. 13–19).

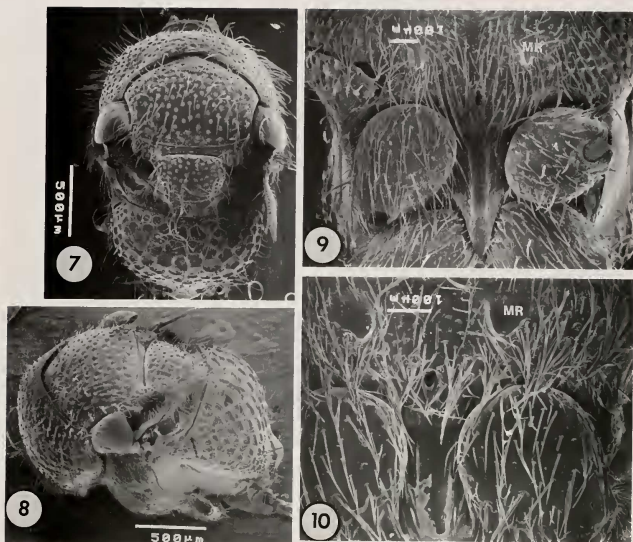
Discussion of the Genus Horcomutilla.—Species of *Horcomutilla*, as well as those of *Pseudomethoca* Ashmead, are present in a range of environments, from those highly degraded by humans to primary humid tropical lowland forests. We have found species of both genera living sympatrically in Panama and Brazil. *Horcomutilla* is closely related to *Pseudomethoca* Ashmead and *Mickelia* Suárez. The latter is at present separated only by its “flattened” flagellomeres, but we consider that the valid diagnostic character is the outline of the thorax: rectangular in *Mickelia* and violin shaped in *Horcomutilla*. We have examined the female paratype of *Mickelia cressoni* Suárez, 1966 (same data as the holotype), and two females of that species from Goiás and Sao Paulo, Brazil. We found that their flagellomeres are not distinctly flattened, but that 4–12 are slightly compressed, looking much like a preservation artifact commonly found among many different mutillid taxa. Moreover, the compression of flagellomeres 1–3 is bilaterally asymmetric.

Preliminary results of a generic phylogenetic analysis of Sphaerophthalminae (Quintero, unpublished) indicate that the monophyly of *Horcomutilla* is supported by the single synapomorphy of the bifid distal third of the parameres. It appears to be a highly derived character within the Aculeata, not mentioned by Brothers and Carpenter (1993). Bifid parameres (biramous gonostyles) are known from a few species in three genera of Sphecidae (Bohart and Menke 1976, p. 21), but is used as a generic character in only one of those genera, *Entomosericus* Dahlbom. The function and structural correspondance of the bifid parameres with the female genitalia is unknown, as is true for most other parts of the male genitalia of aculeate wasps. O'Toole (1975) suggested a locking action

of the parameres (= gonoforceps) for *Timulla oculata* (Fabricius). Instead, we consider that they might function as stimulators, their known function in other insect groups (Eberhard 1985). We have searched and have not been able to find any distinctly modified mating behavior associated with these unique male genitalia (except for the lack of wing tremor during courtship). Neither have we been able to find any special structural modifications on the distal abdominal segments of females of *Horcomutilla* (cf. Figs. 25, 26), except for a slightly wider integumental smooth stripe on the female's abdomen, probably massaged by the male parameres. These lateral stripes are visible on abdominal tergum VI of the female of *H. krombeini* (cf. Fig. 25, 26); no other structural modifications are recognizable. The corresponding smooth stripe is slightly narrower in females of *Pseudomethoca*, whose males have simple parameres (Fig. 26).

Based on females, we can recognize two groups of species in *Horcomutilla*: 1. species (*krombeini*, *maracayi* and *reichi*) with two transverse integumental spots on tergum two, which lack lateral bands of pale pubescence on the dorsum of the thorax, and which are distributed in the northern part of South America, above the Equator. Only one species enters Panama, *krombeini*; 2. species (includes eleven nominal species) with two longitudinally ovate integumental spots on tergum two. Most of these species present lateral bands of pale pubescence on the dorsum of the thorax, except *denticiceps* (Spinola), *suis* Casal, *tal- iata* (Kohl) and *tonocote* Casal. The second group of species is exclusively South American, south of the Equator. We describe here the males of two of the species in the first group.

Nothing is known about the hosts parasitized by *Horcomutilla*, but females have the last abdominal tergum with a well-defined pygidial plate, defined by carinae (Fig. 25), and presumably they parasitize



Figs. 7–10. Thorax details of *Horcomutilla*, males. 7, *maracayi*, thorax, dorsal view ($\times 50$). 8, *maracayi*, thorax, laterodorsal view ($\times 50$). 9, *krombeini*, thorax, ventral view ($\times 100$); MR = mesosternal ridge. 10, *maracayi*, thorax, ventral view ($\times 150$); MR = mesosternal ridge.

ground-nesting aculeates as do other fossorial forms (Naumann 1991, page 923). Numerous females of *H. krombeini* have been collected near aggregations of ground-nesting bees, *Melitoma* sp. (Rio Perequeté, Chorrera), and sphecids, *Cerceris* sp. (Cruce de Mono Station, Parque Nacional Darién), and we suspect they parasitize their nests.

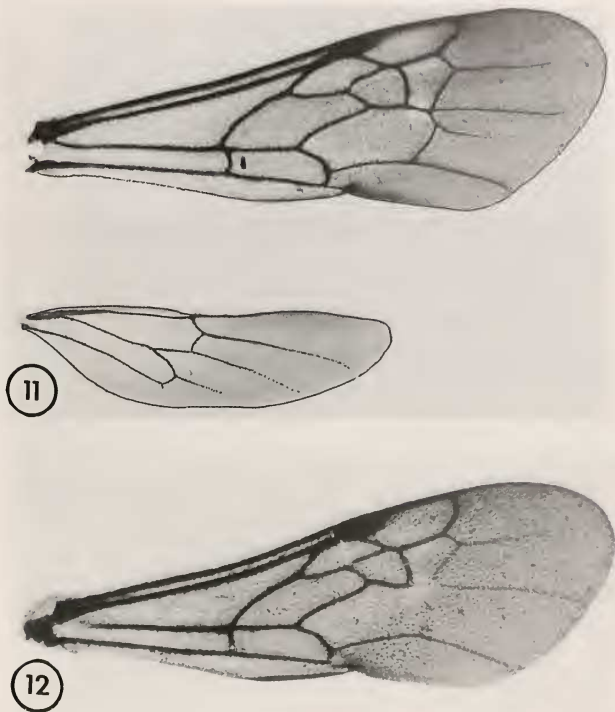
Here we present brief observations on the mating behavior of *Horcomutilla krombeini*, made by Rodolfo Contreras on four couples captured on January 17 and February 23 1992 in Capira, Panama Province. The male approached from behind and mounted the female without the stereo-

typed wing tremor we have observed during the courtship of other genera of Sphaerophthalminae and Mutillinae (Quintero and Cambra, unpublished). Once mounted onto the female, with both individuals facing the same direction, the male grasps the female's "neck" (anterior pronotal area) with his mandibles. The sequence lasts less than two minutes. No observations were made on how the male uses his modified genitalia.

Horcomutilla krombeini Casal, 1965

Figs. 1, 3, 5, 6, 9, 11, 13, 15, 17,
20, 22, 23, 25

Horcomutilla krombeini Casal, 1965: 81–84. Holotype female: PANAMA: Barro Colorado



Figs. 11–12. Wings of *Horcomutilla*, males. 11, *krombeini*, fore and hind wing. 12, *maracayi*, fore wing.

(USNM, No. 67707), examined; Cambra & Quintero 1992: 472–473 (9 additional females).

Male.—Capira [Panama Province], Panama, 1 Feb 1992, R. Contreras, deposited MIUP.

Description of Male.—Integument black, except clypeus pale yellow, and mandi-

bles pale yellow with red tips. Head subrectangular in dorsal view, as wide as thorax; row of six or seven long, erect, dark setae near inner eye orbit; clypeus without tubercles or teeth (Fig. 1); clypeal disk sparsely punctate. Frons, vertex, and genae with shallow, close punctures, not confluent (Fig. 1). Posterior margin of probos-



cidal fossa with triangular projection that is bisected by longitudinal median ridge (Fig. 3).

Head and thorax clothed with long, erect, white setae. Pronotum, mesonotum, and scutellum shallowly, closely punctate, punctures not confluent, about the size of those on head. Tegula glabrous, mostly impunctate; mesopleuron with moderate close punctures, except small area near the metapleuron, which is almost smooth, micropunctate; metapleuron glabrous, unsulptured. Mesosternum with a pair of small ridges, produced posteriorly (Fig. 9).

Legs covered with long, erect, white setae; mid coxae without teeth or carinae; hind coxae carinate on inner margin. Tibial spurs pale.

Abdomen setose throughout, setae sparse, white, mostly erect. Tergum I with small, sparse punctures on disk; posterior margin of terga I and II fully covered with moderate size, nearly contiguous punctures; abdominal segments III–VII with small, very close punctures throughout.

Genitalia with parameres and penis valve as figured (Figs. 13, 15, 17, 20, 22, 23). Body length: 6.5 mm.

Known Distribution.—Panama, Venezuela.

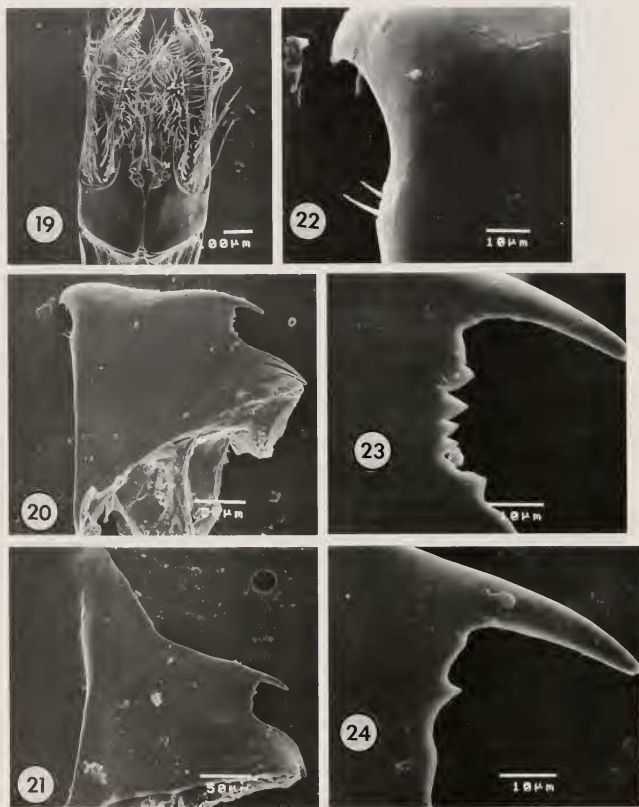
Additional Material Examined.—The finding of *Horcomutilla krombeini* in Venezuela represents a new distribution record, as this species was previously known only from Panama. [Specimens deposited in MIUP, acronymy omitted]. VENEZUELA: Carabobo, 8 May 1990, J. García, 1 female. PANAMA. DARIEN PROVINCE: Cruce de Mono, Estación INRENARE, Parq[ue] Nac[ional] Darién, 6 Feb 1993, R. Cambra & J. Coronado, 2 females; same loc. and collectors but: 7 Feb 1993, 1 female (UMIC); 8 Feb 1993, 1 female (UMIC); 9

Feb 1993, 2 females; 10 Feb 1993, 3 females; 11 Feb 1993, 2 females; 12 Feb 1993, 1 female; 13 Feb 1993, 8 females; 14 Feb 1993, 7 females; 15 Feb 1993, 4 females; 16 Feb 1993, 7 females; 17 Feb 1993, 5 females; 18 Feb 1993, 2 females; 19 Feb 1993, 7 females; 20 Feb 1993, 8 females; 21 Feb 1993, 2 females; 22 Feb 1993, 2 females; 23 Feb 1993, 5 females; 24 Feb 1993, 1 female; 25–28 Feb 1993, 4 females; 1–4 Mar 1993, 2 females. Trocha Yaviza-Pinogana, 27–29 Mar 1990, R. Cambra, 4 males, 1 female. El Real, 4 Feb 1993, R. Cambra & J. Coronado, 4 females. PANAMA PROVINCE: Rio Perequeté, Correg. Playa Leona, Chorrera, 27 Feb 1991, R. Cambra & D. Quintero, 6 females, 1 male; same loc.: 18–20 Mar 1991, R. Cambra, 4 males; 13 Feb 1991, R. Cambra, 3 males; 25 Jan 1992, I. Henry & Castillo, 3 females, 2 males 8 (one male without head); 26 Feb 1991, R. Cambra, 1 male (UMIC). Capira, 22 Feb 1992, R. Contreras, 2 females, 2 males (USNM); Capira, 2 Feb 1992, R. Contreras, 1 male. LOS SANTOS PROVINCE: Guararé, 14 Nov 1994, R. Pérez, 1 female. CHIRIQUI PROVINCE: Las Lajas, 24 Mar 1992, R. Contreras, 2 females.

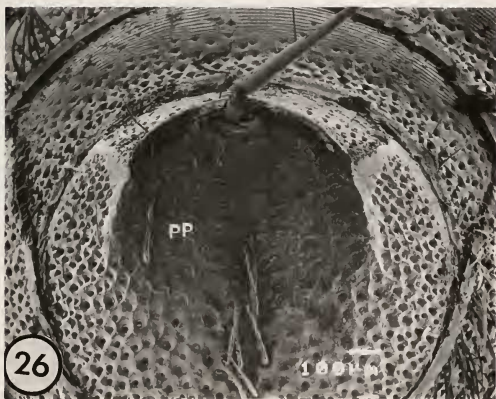
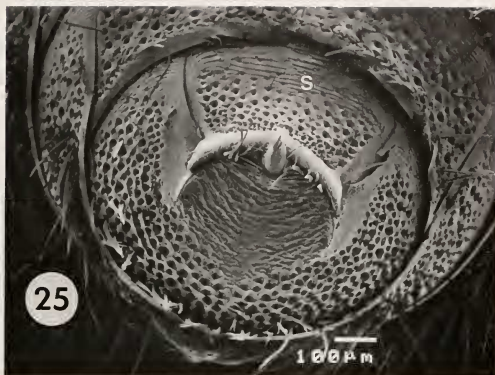
Variation of H. krombeini.—After examining 119 females and 19 males of this species, we found color variation only among females: head integument black (75 per cent of specimens: one female from Venezuela, and the most common color form in the eastern part of Panama) to red (only one specimen); other females have the head black except the frons, vertex (below the white pubescence lines) and gena which are red. The thoracic integument varies from bright red to dark red.

Comments on Sex Associations.—Male and female conspecificity was established

Figs. 13–18. Male genitalia of *Horcomutilla*. 13, *krombeini*, genitalia, dorsal view ($\times 75$). 14, *maracayi*, genitalia, dorsal view ($\times 100$). 15, *krombeini*, genitalia, laterodorsal view ($\times 100$). 16, *maracayi*, genitalia, laterodorsal view ($\times 100$). 17, *krombeini*, distal arms of parameres, dorsal view ($\times 200$). 18, *maracayi*, distal arm of paramere, laterodorsal view ($\times 350$).



Figs. 19-24. Male genitalia of *Horcomutilla*. 19, *maracayi*, genitalia, ventral view ($\times 100$). 20, *krombeini*, penis valve (anterior half), lateral view ($\times 350$). 21, *maracayi*, penis valve (anterior half), lateral view ($\times 350$). 22, *krombeini*, penis valve, anterior dorsal margin ($\times 1500$). 23, *krombeini*, anterior ventral margin ($\times 2000$). 24, *maracayi*, penis valve, anterior ventral margin ($\times 2000$).



Figs. 25–26. Female distal abdominal segments, posterior view. 25. *Horcomutilla krombeini* ($\times 100$); S = sternite VI; PP = pygidial plate. 26. *Pseudomethoca chontalensis* (Cameron) ($\times 75$).

by experimental attraction, in nature, of six males flying upwind to one caged female (not visible from the outside), releasing airborne pheromones, and later obtaining, in a closed container, one positive experimental mating with one of those six males. Although some eager males might attempt to mate with any virgin female inside a close container, we have found that they are never able to force an unreceptive female to mate. Females with which the males are not conspecific are always unreceptive, thus the technique is highly reliable.

Horcomutilla maracayi

Fritz & Martínez, 1993

Figs. 2, 4, 5, 7, 8, 10, 12, 14, 16,
18, 19, 21, 24

Horcomutilla maracayi Fritz & Martínez, 1993: 105–106. Holotype female: VENEZUELA: Aragua, El Limón (Maracay), 450 m (Martínez personal collection).

Male.—VENEZUELA: Aragua, El Limón, 450 m, 27 Apr 1973, C. J. Rosales, deposited MIUP.

Description of Male.—Integument dark red, except clypeus and mandibles, pale yellow. Head subrectangular in dorsal view, as wide as thorax, covered with long, erect, white setae; row of six or seven long, erect, dark setae near inner eye orbit; clypeus without tubercles or teeth (Fig. 2); clypeal disk sparsely punctate. Frons, vertex, and genae with shallow, close punctures, not confluent (Fig. 2). Posterior margin of proboscital fossa with triangular projection not bisected by longitudinal median ridge (Figs. 4, 5).

Thorax with long, erect, white setae. Pronotum, mesonotum and scutellum (Fig. 7) shallowly, closely punctate, punctures about the size of those on head. Tegula glabrous, mostly impunctate (Fig. 7, 8); mesopleuron with moderate close punctures, except small area near metapleuron, which is almost smooth, micro-punctate; metapleuron glabrous, unsculp-

tured (Fig. 8). Mesosternum with a pair of conspicuous tubercles (Fig. 10).

Legs covered with long, erect, white setae; fore and mid coxae without teeth or carinae; hind coxae carinate on inner margin. Tibial spurs pale.

Abdomen setose throughout, setae sparse, white, mostly erect. Tergum I with small, sparse punctures on disk; posterior margin of terga I and II fully covered with moderate size, nearly contiguous punctures; abdominal segments III–VII with small, very close punctures throughout.

Genitalia with parameres and penis valve as figured (Figs. 14, 16, 18, 19, 21, 24). Body length: 7 mm.

Known Distribution.—Venezuela.

Additional Material Examined.—[All specimens deposited in MIUP].—VENEZUELA. Aragua, El Limón, 450 m, 27 Apr 1973, C. J. Rosales, 1 male; same loc, 15 Sep 1955, F. Fernández & C. J. Rosales, 1 female; same loc, 15 Apr 1975, F. Fernández, 1 female.

Variation of H. maracayi.—Only four specimens of this species were examined (two females and two males), and no variation was recognized in that small sample.

Comments on Sex Associations.—*Horcomutilla reichi* (Mickel) is known only from the Venezuelan female holotype, deposited in the Spinola collection, but lacking further collection data. Male and female conspecificity of *H. maracayi* was established by coincident distribution; both females and males were collected from the same locality. No other species of *Horcomutilla* has been reported from the State of Aragua.

Diagnosis, Males of Horcomutilla.—Males of *Horcomutilla krombeini* and *maracayi* are very similar in most external features. However, three distinctive differences are valuable in separating these species reliably: the form of the penis valves (cf. Figs. 20, 21), the shape of the arms of the parameres (cf. Figs. 17, 18), and the shape of the mesosternal ridges (cf. Figs. 9, 10). Mesosternal processes or ridges are rather

uncommon among males of the subtribe *Pseudomethocina* (present in *Horcomutilla krombeini* and *H. maracayi* and some species of *Pseudomethoca*).

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